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TITLE: APPARATUS AND METHOD FOR REPRODUCING CHARACTER INFORMATION RECORDED ON A RECORDING MEDIUM

Hon. Commissioner of Patents and Trademarks,
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S I R:
CERTIFIED TRANSLATION

I, Masaaki Iwami of 3-22, Asagaya-minami 1-chome, Suginami-ku, Tokyo, Japan, am an experienced translator of the Japanese language into the English language and I hereby certify that the attached comprises an accurate translation into English of Japanese Patent Application No. Hei 10-094582 filed on April 7, 1998.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

November 8, 2002
Date

Masaaki IWAMI

[Name of Document] Specification

[Title of the Invention] REPRODUCTION SIGNAL PROCESSING APPARATUS

[What is Claimed is]

[Claim 1] A reproduction signal processing apparatus characterized by comprising:

reproduction means that is capable of reproducing information recorded on a recording medium;

character-information detecting means that is capable of detecting character information recorded in an information control area of said recording medium and reproduced by said reproduction means;

character-string searching means that is capable of searching character information detected by said character-information detecting means for a string of characters representing address information; and

address-information generating means that is capable of generating address information on the basis of a search result output by said character-string searching means.

[Claim 2] A reproduction signal processing apparatus according to claim 1, said apparatus characterized by comprising:

display means for displaying said character

information and;

said address information is displayed in a format different from formats of other character information.

[Detailed Description of the Invention]

[0001]

[Technical Field to which the Invention Pertains]

The present invention relates to a reproduction-signal processing apparatus for searching character information for a string of characters serving as an address and generating the address.

[0002]

[Prior Art]

In recent years, a network constituted by personal computer apparatuses (hereinafter referred to as computer apparatus) owned by users and server apparatuses connected to the personal computer apparatuses by typically telephone lines is becoming popular. The user is capable of obtaining various kinds of information from a server apparatus employed in the network by using the computer apparatus as a terminal of the network. In this case, the user activates browser software for displaying the information on the screen of the computer apparatus and then enters a required address used as a URL (Uniform

Resource Locators) to the browser software. The user then carries out an operation to accomplish communication processing. By doing so, an access is made to a server apparatus specified by the URL through necessary paths on the network. The computer apparatus is then capable of receiving various kinds of information (such as characters and pictures) transmitted by the server apparatus.

[0003]

[Problems to be Solved by the Invention]

By the way, there is known CD-TEXT that allows necessary character information to be recorded typically in a TOC (Table of Contents) in a lead-in area of an audio CD. The character information added to the TOC is information such as the title of the disc, names of artists and/or titles of pieces of music. By reading out such pieces of information from the audio CD and displaying them on a screen, information on contents of the audio CD can be obtained in a literal form.

[0004]

A reproducing apparatus for an audio CD can be connected to or embedded in a computer apparatus. Various kinds of processing carried out by the apparatus of such a type such as reproduction and halt operations can be

controlled by a control means employed in the computer apparatus. In this case, the user carries out a variety of operations in accordance with an operation screen (an operation window), which is generated by the computer apparatus and displayed on a monitor apparatus as a GUI (Graphical User Interface).

[0005]

An operation screen shows, among other things, performance times of pieces of music, character information such as names of artists and titles of pieces of music and buttons to be operated by the user for carrying out various kinds of processing. What appear on the operation screen are all obtained from a TOC. In addition, if more information about the pieces of music and the artists is available in the network, a URL of the information is recorded in the TOC as character information. Therefore, URL can be displayed on the operation screen as the string of characters with the title of piece of music.

Moreover, if it is possible to transmit an electronic mail to an artist, the mail address of the artist is included in the TOC as character information like a URL. The mail address is also displayed on the operation screen as the string of characters.

[0006]

In order to make an access to a URL, which is displayed on the operation screen, however, it is necessary for the user to enter a string of characters representing the URL by itself, to the browser software. In addition, when the browser software is not activated, an operation to invoke the browser software needs to be carried out.

Furthermore, also in order to send an electronic mail, it is necessary for the user to enter a string of characters representing a mail address by itself to mail sending software, (which is referred to hereafter simply as a mailer).

[0007]

As described above, when the user actually makes an access, the user has to enter a string of characters to make an actual access in spite of the fact that the string of characters representing an address is displayed on the operation screen. Thus, the user has to carry out complicated operations for inputting a lot of characters. As a result, there is raised a problem of incapability to obtain information from the network with ease.

In addition, when a wrong string of character is entered, a correct access cannot be made even if a

communication processing is started. As a result, the communication processing is aborted in some cases.

[0008]

[Means for Solving the Problems]

To solve the above problems, according to the present invention, there is provided a reproduction signal processing apparatus including:

a reproduction means for reproducing information recorded on a recording medium; a character-information detecting means for detecting character information recorded in an information control area of the recording medium and reproduced by the reproduction means; a character-string searching means for searching character information detected by the character-information detecting means for a string of characters representing address information; and an address-information generating means for generating address information on the basis of a search result output by the character-string searching means.

[0009]

According to the present invention, a string of characters corresponding to address information can be recognized as address information. Therefore, it is possible to eliminate an operation to enter a complex

string of characters in order to make an access to such an address or other purposes.

[0010]

[Mode for Carrying out the Invention]

Hereinafter, the one embodiment of present invention is explained. A reproduction apparatus implemented by an embodiment of the present invention is a CD player, which is capable of reproducing an optical disc (CD).

It should be noted that the description is given in the following order.

(1) Configuration of the Computer Apparatus
(2) Configuration of the Reproduction Apparatus
(3) TOC and Sub-code
(4) Text Data
(5) Display Formats of the Operation Screen
(6) Disc Mounting Processing

[0011]

(1) Configuration of a Computer Apparatus

Fig. 1 is an explanatory functional block diagram

showing the configuration of a computer apparatus. Functional blocks shown in the figure other than a reproduction apparatus 20 can be implemented by software or hardware.

[0012]

A computer apparatus 1 is implemented by the so-called personal computer apparatus. The computer apparatus 1 is designed to carry out processing operations based on software as an operating system (OS) assuming basic operations and software (application software) as a variety of applications to satisfy needs of the user. Application software in this embodiment include a driver software for driving a reproduction apparatus such as a CD player to be described later and a browser software for viewing information obtained from a network such as the Internet.

[0013]

An input apparatus used by the user for executing requesting various kinds of processing operations include a keyboard 2 and a mouse 3. Various kinds of operation information entered via the keyboard 2 and the mouse 3 are supplied to a control unit 4 which then executes control of functional blocks described below based on the operation information.

The mouse 3 is used for moving a pointer displayed on a monitor apparatus. After positioning the pointer to point to one of a variety of icons formed as a GUI by operating the mouse 3, a button on the mouse 3 is clicked to execute a function corresponding to the icon pointed to by the pointer.

[0014]

A recording medium 5 is implemented typically by a hard disc apparatus for storing, among other things, the OS and the variety of application software. Normally, the OS is loaded when the computer apparatus 1 is activated. Application software is loaded from the recording medium 5 into the memory 6 appropriately when necessary after the computer apparatus 1 is activated. The memory 6 is implemented typically by a RAM (Random Access Memory).

The memory 6 includes a buffer area for storing software loaded from the recording medium after activation of the computer apparatus 1 and a work area for carrying out processing by execution of various kinds of software.

[0015]

The OS and application software, which are loaded into the memory 6 and put in an active state, are designed to include various kinds of data such as picture

data for constructing the GUI or necessary audio data like an alarming sound. The picture data and the audio data are appropriately loaded from the memory 6 in accordance with an operation carried out by the user to be supplied to a picture-signal processing unit 7 and an audio-signal processing unit 9 respectively.

On the basis of the picture data received from the memory 6, the picture-signal processing unit 7 generates picture signals for forming a GUI such as a menu screen for facilitating implementations of a variety of operations and various kinds of setting, a window for displaying various kinds of information, and a pointer. A picture signal is then supplied to a monitor apparatus 8, which is installed at an external location and used for displaying a picture, to be displayed thereon as a GUI picture by way of an output terminal t1.

[0016]

On the basis of the audio data received from the memory 6, the audio-signal processing unit 9 generates an audio signal of an alarming sound for an operation carried out by the user or the like. The audio-signal processing unit 9 is also capable of generating an audio signal based on data produced by the reproduction apparatus 20 to be described later. An audio signal

generated by the audio-signal processing unit 9 is output to the speaker 10 installed at an external location by way of an output terminal t2.

It should be noted, however, that the monitor apparatus 8 and the speaker 10 can also be integrated with the computer apparatus 1 to form a single body.

[0017]

In addition, an interface 11 is provided to enable the computer apparatus 1 to receive and transmit various kinds of information to a network through a telephone line used as a network line. Composed of typically a modem and a terminal adapter (TA), the interface 11 is used for demodulating coded data received from the network line through an interface terminal t3. Then, the demodulated data (characters, a picture, or a sound) is stored temporarily into the buffer area of the memory 6 to be read out later selectively when necessary.

[0018]

The computer apparatus 1 also transmits various kinds of data to a server apparatus provided in the network to serve as a source of various kinds of information for distribution after the data has been temporarily stored in the buffer area of the memory 6, then modulated by the interface 11 into properly coded

data, and transmitted through the interface terminal t3. Examples of the data are a URL (Uniform Resource Locator) and data generated by the computer apparatus 1 for transmission such as an electronic mail, text data, and picture data. A URL is an address code used in necessary access processing.

It should be noted that the interface 11 can also be provided as a unit external to the computer apparatus 1.

[0019]

The reproduction apparatus 20 employed in this embodiment is capable of carrying out CD-DA reproduction processing on audio data recorded on typically an optical disc.

If a TOC read out by the reproduction apparatus 20 includes CD-TEXT data, the CD-TEXT data is stored in the memory 6 to be subjected to a necessary decoding process for converting the data into character information. The decoding process of the CD-TEXT data is carried out by the computer apparatus 1 by execution of software. It should be noted, however, that hardware for carrying out the decoding process of the CD-TEXT data can be provided in the computer apparatus 1 or the reproduction apparatus 20 in place of the decoding software.

[0020]

Character information includes information about pieces of music recorded on the disc such as the title of the disc, names of artists and besides a URL and electronic-mail address which can be used for obtaining more information about the pieces of music and the artists from the network.

In the present invention, such character information is searched for a string of characters. When a string of character with a typical format of "http://www.***.***" indicating a URL or a string of character with a typical format of "***@***.**.**" indicating an electronic-mail address is detected, typically, the control unit 4 recognizes this string of characters as a URL or an electronic-mail address (which are both referred to hereafter as address information).

[0021]

These pieces of address information are each displayed typically as an icon or a string of characters along with the information about names of pieces of music and the like as will be described later. By selecting one of the icons or the strings of characters, processing to acquire information stored at the URL or processing to invoke software for creating an electronic mail is

carried out.

[0022]

(2) Configuration of the Reproduction Apparatus

Fig. 2 is an explanatory block diagram showing a typical configuration of the reproduction apparatus 20.

The reproduction apparatus 20 has a configuration capable of reproducing a signal from a disc 21 such as a CD-ROM, a CD, or a CD-TEXT. The disc 21 is mounted on the reproduction apparatus so that it can be driven into rotation by a spindle motor 22. The reproduction apparatus 20 is controlled by the control unit 4 employed in the computer apparatus 1 shown in Fig. 1 and, with the spindle motor 22 put in a rotating state, data recorded on the disc 21 is read out by an optical pickup 23.

[0023]

A reproduction signal generated by the optical pickup 23 is supplied to a servo-signal processing unit 30. In the servo-signal processing unit 30, first of all, the reproduction signal from the disc 21 is received by an RF amplifier 31, which converts the reproduction RF signal into binary data. In addition, the RF amplifier 31 also carries out various kinds of signal processing for

generating a tracking-error signal TE and a focus-error signal FE.

The tracking-error signal TE and the focus-error signal FE generated by the RF amplifier 31 are supplied to a servo-signal processing circuit 32 which generates a variety of servo drive signals for executing various kinds of control such as tracking control and focus control. The servo drive signals are supplied to a focus driver 33 and a tracking driver 34 to drive a focus actuator and a tracking actuator respectively, which are provided in the optical pickup 23, in order to execute a variety of servos.

It should be noted that other servo mechanisms not shown in the figure such as a thread mechanism for moving the optical pickup 23 in the radial direction of the disc 21 is controlled also by a servo drive signal generated by the servo-signal processing circuit 32.

[0024]

The reproduction RF signal generated by the RF amplifier 31 is supplied to a PLL circuit 35, an EFM-demodulation circuit 36, and a timing-generation circuit 37.

The PLL circuit 35 generates a clock signal synchronized with the reproduction RF signal, supplying

the clock signal to the EFM-demodulation circuit 36 which carries out pieces of processing such as EFM demodulation and CIRC decoding in order to generate a digital audio signal from information read out from the disc 20.

The digital audio signal is supplied to a signal processing unit 38 to be subjected to various kinds of processing such as error correction and error-data interpolation before being output to an interface 42. Implemented typically by an SCSI (Small Computer System Interface) or an ATAPI (AT Attachment Packet Interface), the interface 42 allows the reproduction apparatus 20 to be connected to the computer apparatus 1 shown in Fig. 1.

[0025]

The timing-generation circuit 37 generates a timing signal synchronized with the reproduction RF signal and supplies the timing signal to a CLV (Constant Linear Velocity) processor 39, which drives the spindle motor 22 to rotate at a constant linear velocity in a state synchronized with the reproduction RF signal.

A sub-code separated by the EFM-demodulation circuit 36 is supplied to a sub-code processor 40 which carries out various kinds of processing including detection of an error from the sub-code, separating data of P and Q channels composing the sub-code and data of R

to W channels from each other. The pieces of data of P and Q channels and data of R to W channels are supplied to the interface 42.

CD-TEXT data included in the R to W channels of the sub-code recorded in the TOC is transferred to the computer apparatus 1 by way of the interface 42 as will be described later.

[0026]

In an operation to reproduce a signal from the disc 21, which is a CD-ROM, a signal output by the servo-signal processing unit 30 is supplied to a CD-ROM-signal processing unit 50. In the CD-ROM, a sub-code length of 1/75 second is prescribed as a data unit. That is to say, a data length of 2352 bytes is treated as one block with a sync of 12 bytes placed at the beginning of the block to be followed by a header of four bytes. User data is included in the block after the header. The header includes the same address as an absolute address of the Q channel of the sub-code recorded on a CD. The data structure of the CD-ROM includes prescriptions of mode 0, mode 1, mode 2 (form 1), and mode 2 (form 2). Data other than the sync is scrambled. In addition, an error detection signal or an error correction signal is coded for each block.

[0027]

Such data for the CD-ROM is divided into blocks to be subjected to various kinds of processing such as error-correction coding and EFM modulation before being recorded onto the CD-ROM. For this reason, the CD-ROM-signal processing unit 50 includes a descrambler 51 for descrambling the data and an error-correction circuit 52 for decoding the error-detection signal or the error-correction signal of each block. Reproduction data of the CD-ROM generated by the error-correction circuit 52 is transferred to the computer apparatus 1 by way of the interface 42.

[0028]

Implemented typically by a microcomputer, a system controller 41 controls the servo-signal processing unit 30, the CD-ROM-signal processing unit 50 and the interface 42 in order to carry out various kinds of processing. For example, reproduction process is carried out from the disc 21 in accordance with a read command issued by the computer apparatus 1 and the reproduction data is supplied to the computer apparatus 1 by way of the interface 42.

[0029]

(3) TOC and Sub-code

The following is a description of a sub-code and the TOC recorded in the lead-in area of the disc 21.

The smallest unit of data recorded on the disc 21 is one frame. 98 frames constitute one block (one sub-coding frame).

[0030]

The structure of one frame is shown in Fig. 3.

As shown in the figure, a frame is 588 bits in length. At the head of the frame, 24-bit synchronization data is provided, being followed by three margin bits. The margin bits are followed by a 14-bit sub-code data area, which is followed by main data of 12 symbols and parity data of four symbols.

[0031]

Ninety-eight frames having such a configuration constitute one block. Sub-codes fetched from 98 frames are gathered to form sub-code data of a block like one shown in Fig. 4(a).

To be more specific, sub-codes fetched from the first and the second of the 98 frames, that is, frames (98n + 1) and (98n + 2), are used as a synchronization pattern. Sub-codes fetched from the third to the 98th of

the 98 frames, that is, frames (98n + 3) to (98n + 98), constitute channel data of the 96 bits, that is, sub-code data of the P, Q, R, S, T, U, V, and W channels.

[0032]

The P and Q channels are used for control of operations such as an access. However, the P channel merely shows a pause portion between tracks so that finer control needs to be carried out by using the Q channel (Q1 to Q96). The 96-bit data of the Q channel has a structure shown in Fig. 4(b).

Data of the R to W channels is provided to form a text data group as will be described later.

[0033]

In the first place, the four bits Q1 to Q4 are used as control data providing identification such as the number of audio channels, an emphasis, and CD-ROM.

To put it in detail, the four bits of the control data are defined as follows.

"0***" ----- two audio channels

"1***" ----- four audio channels

"*0**" ----- CD-DA

"*1**" ----- CD-ROM

"**0*" ----- Impossible digital copying

"**1*" ----- Possible digital copying

"***0" ----- With no preamphasis

"***1" ----- With preamphasis

[0034]

The next four bits Q5 to Q8 are an address and also serves as control bits of sub-Q data.

To put it in detail, a four-bit address of "0001" indicates that the following sub-Q data Q9 to Q80 is audio Q data while a four-bit address of "0100" indicates that the following sub-Q data Q9 to Q80 is video Q data.

Thus, the 72 bits Q9 to Q80 are sub-Q data whereas the remaining bits Q81 to Q96 are a CRC.

[0035]

Sub-Q data recorded in the lead-in area is TOC information.

That is to say, the sub-Q data composed of the 72 bits Q9 to Q80 of the Q-channel data read out from the lead-in area has information like one shown in Fig. 5(a). The sub-Q data includes pieces of data each having a length of eight bits.

[0036]

First, a track number is recorded. The track number for the lead-in area is a fixed number of "00".

Following the track number is POINT, which is followed by MIN (minutes), SEC (seconds), and FRAME (a

frame number) as the elapsed time of the track.

The last three pieces of data are PMIN, PSEC, and PFRAME, which have the following meanings depending on the value of POINT.

[0037]

A value of POINT in the range "01h" to "99h" (where the suffix h indicates that the value is expressed in the hexadecimal format) is a track number. In this case, the start point (the absolute-time address) of a track indicated by the track number is recorded in terms of minutes (PMIN), seconds (PSEC), and in terms of a frame number (PFRAME).

[0038]

In the case of a POINT value of "A0h", the track number of a first track is recorded in PMIN. A CD-DA, a CD-I, and a CD-ROM (with XA specifications) are distinguished from each other by the value of PSEC.

In the case of a POINT value of "A1h", the track number of a last track is recorded in PMIN.

In the case of a POINT value of "A2h", the start point of a lead-out area is recorded in PMIN, PSEC, and PFRAME as an absolute-time address.

[0039]

In the case of a disc with data recorded on six

tracks thereof, the TOC for recording pieces of sub-Q data has a data structure like one shown in Fig. 6.

As shown in the figure, the track numbers TNO are all "00h".

A block number is the number of a piece of sub-Q data read out as block data of 98 frames as described above.

TOC data is stretched over three blocks each having the same contents.

As shown in the figure, in the case of POINT having a value in the range "01h" to "06h", PMIN, PSEC, and PFRAME show the start point of track #1 to track #6 respectively.

[0040]

In the case of a POINT value of "A0h", the track number "01h" of a first track is recorded in PMIN. Discs are distinguished from each other by the value of PSEC. To be more specific, when the disc is a CD-DA, PSEC = "00h". When the disc is a CD-ROM (with XA specifications), PSEC = "20h". When the disc is a CD-I, PSEC = "10h".

[0041]

In the case of a POINT value of "A1h", the track number of a last track is recorded in PMIN while, in the case of a POINT value of "A2h", the start point of a

lead-out area is recorded in PMIN, PSEC, and PFRAME.

Block (n + 27) and subsequent blocks each contain the same data as blocks n to (n + 26).

[0042]

On the disc 1, sub-Q data recorded on tracks #1 to #n for recording actual data such as music and the lead-out area includes information shown in Fig. 5(b).

The first field is a track number, which has a value in the range "01h" to "99h" in each track #1 to #n. In the lead-out area, the track number is a fixed value of "AAh".

The next field is an index for recording information that allows a track to be divided into finer portions.

[0043]

The elapsed time of the track is recorded in terms of minutes (MIN), seconds (SEC), and in terms of a frame number (FRAME).

An absolute-time address is recorded in terms of minutes (AMIN), seconds (ASEC), and in terms of a frame number (AFRAME).

[0044]

The TOC and a sub-code are formed as described above. An address on the disc, that is, AMIN, ASEC, and

AFRAME, are recorded for each 98 frames as is obvious from the above description.

The 98 frames (one block) is referred to as a sub-coding frame. Thus, audio data of one second in length includes 75 sub-coding frames. That is to say, "AFRAME" representing an address has a value in the range "0" to "74". It should be noted that, in frame check processing to be described later, continuity of data is checked in sub-coding-frame units.

[0045]

(4) Text Data

The following is a description of text data included in sub-codes with structures shown in Figs. 3 and 4. First of all, a general structure of text data is explained by referring to Figs. 7.

When only text data is extracted from a sub-code and looked at structurally, the text data will be found out to be like one shown in Figs. 7. The largest unit of text data is a "text" shown in Fig. 7(a). Fig. 7(a) shows a plurality of texts which each has the same data content. That is to say, a predetermined number of recorded texts each having the same data content is recorded in a sub-

code.

[0046]

One text constitutes, for example, a maximum of 2048 packs (the definition of pack is described later). Considering a time to read out a text for one text, however, it is recommended that a text be composed of within 512 packs. Such a recommended text has a data amount of about 6500 characters.

As shown in Fig. 7(b), a text constitutes blocks #0 to #n (where $0 \leqq n \leqq 7$). Thus, a text constitutes up to eight blocks.

The blocks in the text each contain the same information of text data described in a language, which varies from block to block. For example, block #0 contains text data representing various kinds of information on the disc described in English while block #1 contains the same text data as block #0 described in Japanese.

[0047]

Since a text can be composed of up to eight blocks, the format of text data for this embodiment can be provided for a maximum of eight languages.

As shown in Fig. 7(c), a block constitutes data units, namely, pack #0 to pack #n. Here, a block is

composed of up to 256 packs. The data structure of a pack and information related thereto are described by referring to Figs. 8, 9, and 10.

[0048]

Fig. 8(a) is a diagram showing data areas of a sub-coding frame of Figs. 4, which constitutes 98 frames as described earlier.

The first and second frames of the 98 frames, that is, frames (98n + 1) and (98n + 2), are used as areas for synchronization patterns S0 and S1 respectively as has been described earlier by referring to Figs. 4. The areas of the P and Q channels in the third to 98th frames, that is, frames (98n + 3) and (98n + 98), are data areas for the sub-codes P and Q respectively which are used for data for control of typically accesses as described earlier.

[0049]

The areas of the R to W channels in the third to 98th frames are packs 0 to 4 as shown in the figure. The data size of each pack is fixed. As shown in Fig. 8(b), a pack constitutes 24 symbols, namely, symbols 0 to 23. As shown in Fig. 8(c), a symbol is a six-bit data unit including channel data of the R, S, T, U, V, and W channels of one frame. In this case, the data of the R

channel is the MSB and the data of the W channel is the LSB.

[0050]

Fig. 9 is a diagram showing a data structure including the four packs, namely, packs 0 to 3, extracted from the sub-coding frame with a structure shown in Fig. 8(a).

As has been explained by referring to Figs. 8, a pack constitutes 24 symbols (six bits). Thus,

6 bits × 24/8 = 18 bytes.

That is to say, the data size of a pack is 18 bytes. A pack occupies 16 bytes by an ID area at the beginning of the pack and a text-data area following the ID area as shown in the figure. The remaining two bytes are used as a CRC area.

As described earlier, a sub-coding frame includes four packs and a data unit constituting a set of such packs is defined as a packet. Since a pack constitutes 24 symbols, a packet can be regarded to be

4 (symbols) × 24 (pack) = 96 (symbols).

Therefore, a packet is composed of 96 symbols.

[0051]

By the way, the format of text data in the embodiment includes a CRC error detection code as described above. Error correction is not performed when text data is read out. Instead, errors are accumulated for detection. When an error is detected, data is detected again.

Thus, the data overwrote four times for each pack. In addition, data is written repeatedly in packet periods each start at the beginning of a data series and end at the tail of the data series. With such a scheme, a processing circuit with a complex configuration required for error correction of text data can be eliminated from the configuration of a CD changer player of the embodiment adapted to the text data.

[0052]

Figs. 10 and 11 each shows a serial expression of data of one pack shown in Fig. 9.

As is obvious from Fig. 10(a), data is treated in the format of text data adopted by the embodiment wherein six-bit symbols are arranged serially to form a series of data, which is delimited at intervals of eight bits (one byte).

[0053]

As shown in Figs. 10(b) and 11, in the format of

text data adopted by the embodiment, an ID area at the beginning of a pack is used for recording four pieces of ID data, namely, ID1, ID2, ID3, and ID4. By treating and delimiting the data in the format of the embodiment at intervals of eight bits (one byte), the each ID is respectively data unit of eight bits (one byte). Therefore, the remaining area of 12 bytes following ID1 to ID4 at the beginning of the 16 bytes at the beginning of the pack can be reserved as a text-data area and the remaining two bytes following the 16 bytes are a CRC area as shown in Fig. 10(b).

The 12-byte text-data area is treated as eight-bit data units text 1 to text 12 as shown in a pack structure of Fig. 11.

[0054]

In the format of text data adopted by the embodiment, data in a pack is controlled in eight-bit units. More detailed explanation is eliminated. At any rate, text data can be processed by adopting a processing method for data of the Q channel, which is processed in eight-bit units.

[0055]

In the format of text data adopted by the embodiment, in conformity with a format of a CD other

than that for the text data, the high order three bits of ID1 at the beginning of a pack can be interpreted as a MODE and the following three bits can be treated as an ITEM as shown in Fig. 12.

In the three-high-order-bit mode, a value of "100" is set to the three bits to represent mode 4. At the present state of the art, mode 4 is undefined. In this way, if a CD for recording text data is mounted on a reproduction apparatus not compatible with the text data, the value set in the mode field is not recognized as a mode, causing the operation to be merely halted. As a result, no incorrect operation is carried out.

It should be noted that, since mode 5 and mode 6 also each exist as an undefined mode, these modes can also be set in the mode field in place of mode 4. As references, modes such as mode 1 for a CD-G and mode 3 for a CD-MIDI are already in use.

It is also worth noting that values for the ITEM are not set specially. As will be described later, the value of the low-order three or more bits varies in dependence on identification contents defined by ID1. (In actuality, only the low-order four bits change.)

[0056]

The following is a description of definitions of

ID1, ID2, ID3, and ID4 in the format of text data adopted by the embodiment with reference to Figs. 13, and 14. Figs. 13(a) to 13(d) show the ID1 to ID4 respectively and Fig. 14 shows descriptions of identification contents in ID1.

The ID1 (eight-bit) shown in Fig. 13(a) is for setting a data for identifying the meaning of a string of characters stored in an area following text 1 in a text-data area of a pack. The ID1 can have a value in the range "80h" to "8Fh".

The reason why the high-order four bits of ID1 are always set at a hexadecimal value of "8" is that; when the high-order three bits of ID1 are interpreted as a MODE, the mode has a value of "100" for being recognized as mode 4 as described earlier by referring to Fig. 12.

[0057]

The meanings of the values "80h" to "8Fh" set in ID1 are shown in Fig. 14. As shown in the figure, in the case of ID1 having a value of "80h", a string of characters following text 1 is the title of an album (if the value of ID2 is "00h"), or the name of a piece of music or the like recorded on the track (if the value of ID2 is in the range "01h" to "63h").

In the case of ID1 having a value of "81h", a

string of characters following text 1 is the name of a performer, a conductor, or an orchestra. If ID1 has a value of "82h" or "83h", the string of characters is the name of a lyric writer or a songwriter respectively. In the case of ID1 having a value of "84h", the string of characters is the name of a music arranger. An ID1 having a value of "85h" indicates that the string of characters is a message from the CD provider (such as the name of a record manufacturer) or a message from the performer.

[0058]

In the case of ID1 having a value of "86h", the string of characters is a disc ID represented by, for example, a catalog number or the name of the record manufacturer. If ID1 has a value of "87h", the string of characters is text data showing a genre. In the case of ID1 having a value of "88h", the string of characters is TOC data. The TOC data typically represents contents conforming to sub-code data of the Q channel. If ID1 has a value of "89h", the string of characters is a second TOC.

ID1 values of "8Ah", "8Bh", and "8Ch" are RESERVED.

[0059]

In the case of "8Dh", the string of characters is a comment on information about manufacturing control of the

CD, contents recorded in the pack, or the like. If ID1 has a value of "8Eh", the string of characters is a POS code of the album or an ISRC code of the track.

In the case of an ID1 value of "8Fh", the string of characters is the character code, the track number of the first track, the track number of the last track, a copy-protection flag, a pack number in the block, or the like.

[0060]

ID2 shown in Fig. 13(b) is a track number identifying a track to which the string of characters following text 1 in the text-data area of the pack corresponds. The eight bits of ID2 can have a value in the range "00h" to "63h" (or the decimal-value range 0 to 99). However, since a track number incremented from '1', ID2 represents a track number in the range "01h" to "63h" (or the decimal-value range 1 to 99). The value "00h" is a value for representing the disc as a whole.

The MSB of ID2 is an extension flag, which is always set at "0". A value of "1" indicates that the extension flag is set.

[0061]

ID3 shown in Fig. 13(c) is an internal sequence number of the pack in the block. The internal sequence number indicates the order number of the pack in the

block to which the pack pertains. The eight bits of ID3 can have a value in the range "00h" to "FFh" (or the decimal-value range 0 to 255).

[0062]

ID4 shown in Fig. 13(d) represents a block number of the present pack (including information for identifying a character code) and the character position of the string of characters as a set.

The MSB is a two-byte-code flag area indicating whether text data in the pack is a one-byte code or a two-byte code. To be more specific, the two-byte-code flag having a value of '1' indicates that the text data is a two-byte code while the two-byte-code flag having a value of '0' indicates that the text data is a one-byte code.

The three bits following the MSB, that is, the second to fourth bits, indicate a block number identifying a block (See Fig. 7(b)) including the pack. The block number is a value in the range "000" to "111" expressed in the binary format (the decimal-value range 0 to 7). As described earlier by referring to Figs. 7, there are a maximum of eight blocks each having a value as the block number in the range block number 0 to 7 which correspond to the value obtained by the three bits.

[0063]

By the way, in the present state of the art, at least in block #0, the use of only the 8859-1 code including the ASCII code as text data is prescribed. That is to say, in block #0, text data for expression generally using English as a language is stored. It should be noted that, in the following description, the language for block #0 is English for the sake of convenience and the ASCII code is used as a character code. Since the ASCII code (and the 8859-1 code) are a one-byte code, the high-order four bits of ID4 in all pack included in block #0 is "0000".

[0064]

The low-order four bits of ID4 are information on a character position in the present pack. That is to say, the low-order four bits of ID4 indicates that character data stored in the first text 1 in the text-data area of this pack is which position of character in a string of characters forming a set. As shown in Fig. 13(d), the value of the low-order four bits is in the range "0000" to "1111" expressed in the binary format. In the case of a character at the 16th or subsequent position, the value is "1111".

A string of characters forming a set means, for

example, a string of consecutive characters representing the name of a piece of music on one track in the case of data representing the name of a piece of music on a track.

[0065]

Fig. 15 shows a typical structure of a pack, when the text data representing the name of a piece of music for each track is stored in the text-data area. In this case, as described earlier by referring to Figs. 13(a) and 14, ID1 has a value of "80h", and ID2 has a value in the range "01h" to "63h" (a track number in the range 1 to 99) respectively of a track number corresponding to a track of a title described by text data in the pack. ID3 is an internal sequence number of the pack in a block, which has a value in the range "00h" to "FFh". The three bits in ID4, namely the second to fourth bits, are a block number of a block (See Fig. 7(b)) that contains this pack whereas the MSB indicates whether the character code for the block is a two-byte code or a one-byte code. For example, if text data of this pack is the ASCII code, the high-order bits of ID4 are "0000" as described earlier.

[0066]

As described earlier, the low-order four bits of ID4 indicates that character data stored in the text 1 is

which position of character in a string of characters forming a set. In the case of text data showing the name of a piece of music for each track, 'the string of characters forming a set' is a string of characters representing the name of the piece of music for each track. Assume, for example, that the name of the piece of music is "THIS IS A PEN." In this case, if the second character "H" in the string of characters "THIS_IS_A_PEN" is stored in text 1 of the pack, the lower four bits of ID4 of this pack will be "0001 (1h)".

[0067]

Accordingly, the first character "T" in the string of characters "THIS_IS_A_PEN" is stored in the text-data area just before the pack. That is to say, the format of text data adopted in this embodiment allows a string of characters forming a set to be stored in a text-data area stretched over consecutive packs. Detailed explanation of the format is omitted though.

Data constituting character codes showing the name of a piece of music for each track is stored in eight-bit text-data areas text 1 to text 12 according to rules conforming to the text-data format adopted in this embodiment.

[0068]

(5) Display Formats of the Operation Screens

Figs. 16(a) and 16(b) are explanatory diagrams each showing a typical screen of an operation window, when the software for driver (driver software) to carry out a variety of operations such as a reproduction operation to the reproduction apparatus 20 is activated.

When the user carries out a necessary operation to reproduce a disc mounted on the reproduction apparatus 20, the computer apparatus 1 activates software for the reproduction apparatus 20 and displays the operation window 70 on the monitor apparatus 8.

[0069]

A menu bar 71 formed inside the operation window 70 includes operation items each allowing a necessary operation to be carried out by the drive software. An operation item can be selected by using typically a pointer, which is not shown in the figure, and when a necessary operation is carried out on the selected item, typically a pull-down menu associated with the item is displayed.

A disc-title display portion 73, an artist-name display portion 74, and a track-name display portion 75

are areas for displaying character information such as track names representing the title of the disc, the names of artists, and name of piece of music which are extracted from CD-TEXT data read out respectively from the disc 21 mounted on the reproduction apparatus 20.

[0070]

An address-icon portion 76 is a display format to be operatable, when the string of characters such as "http://www.***.***" representing a URL or a typical format of "***@***.**.**" representing an electronic-mail address in the string of characters' array extracted from the CD-TEXT data is detected.

An operation-icon group 77 forms operation icons to carry out operations such as reproducing, halting, and temporarily halting the disc.

[0071]

Fig. 16(a) shows a window in a state with no disc mounted on the reproduction apparatus 20. In this state, no disc title, no artist names, and no track names are displayed on the window. In addition, the address-icon portion 76 is displayed in a state that can not be operated.

As the disc 21 with the TOC thereof including CD-TEXT data such as the disc title is mounted on the

reproduction apparatus 20, the disc-title display portion 73, the artist-name display portion 74, and the track-name display portion 75 for displaying the disc title, the names of artists, and track names respectively appear on the window as shown in Fig. 16(b). In this example, nine pieces of music are recorded on the disc 21 mounted on the reproduction apparatus 20.

[0072]

The window of Fig. 16(b) also shows strings of characters representing a URL and an electronic-mail address included in the CD-TEXT data. Information on artists and the pieces of music recorded on the disc 21 can be obtained from the URL and/or the electronic-mail address. The URL and the electronic-mail address are displayed respectively as a URL icon 76b and a mail icon 76a on the address-icon portion 76 in a state that can be operated, that is, in the so-called active (clickable) display state. The information on the disc 21 such as the disc title and the addresses is read out from the disc 21 and subjected to a decoding process before being stored in the memory 6. In the memory 6, the information is synthesized with the operation window 70 to be displayed on the screen.

It should be noted that, if address information is

not included in the CD-TEXT data, the address-icon portion 76 is displayed on the window of Fig. 16(b) in an inactive state as is the case with the window shown in Fig. 16(a). That is to say, if only the string of characters representing the URL is detected, only the URL icon 76b is displayed in an active state.

[0073]

With the operation window 70 displayed in a state like the one shown in Fig. 16(b), selecting the URL icon 76b by using typically a pointer and clicking the icon 76b will cause the computer apparatus 1 to first of all activate the browser software in order to obtain file data corresponding to the URL in the network. After the browser software is activated, a process for starting a communication with the server apparatus, which stores file for the URL, is performed. It should be noted that, if the browser software has been activated by the time the URL icon 76b is operated, operating the URL icon 76b will cause a necessary communication to be started.

[0074]

If the mail icon 76a is selected and operated for execution, on the other hand, the mailer is activated with the electronic-mail address set as a transmission destination. Thus, the user needs only to write a text

for the mailer and carry out an operation to let the mailer send the text. In this way, the text can be sent as an electronic mail.

[0075]

Figs. 17 show typical windows for a case in which the disc 21 is a recorded omnibus album including pieces of music performed by a plurality of artists. For each artist or each piece of music, a URL and an electronic-mail address are recorded.

In this case, the track-name portion 75 an address icon 78 (a circle-shaped mark) to indicate whether or not an address exists.

To be more specific, Fig. 17(a) shows a window with the disc 21 not mounted yet on the reproduction apparatus 20. Thus, in this initial state, each address icon 78 is in an inactive state represented by a white circle in the figure.

[0076]

As the disc 21 is mounted on the reproduction apparatus, the window changes from this initial state to a screen shown in Fig. 17(b) on which the name of the disc, names of artists, and names of tracks are displayed. In addition, the address icons 78 corresponding to a track (piece of music) that detected a string of

characters for the URL each turns into typically a black circle (an active state). On this typical screen, tracks 1, 2, 4, 6, 7, and 9 each have address information thereof detected. That is to say, the display states of the address icons 78 tell whether URLs for the pieces of music exist or not.

[0077]

Assume that the user operates the address icon 78 of track 2. In this case, a communication process with the URL including the activation process of the browser software is executed. Also in this case, if the browser software has been invoked, only the communication process needs to be started.

As described above, the window shows address icons 78 each representing a URL. It should be noted, however, that an address icon 78 can be used to represent an electronic-mail address as well. As an alternative, if both a URL and an electronic-mail address are detected for a track, two address icons 78 can also be displayed for the track to represent the URL and the electronic-mail address respectively.

[0078]

In addition, a URL can be displayed for example as a string of characters along with various kinds of other

information on the disc.

Assume for example that the pointer 79 is moved to the disc-title display portion 73 as shown in Fig. 18(a) and clicked. In this case, an information window 80 appears to display information on the disc mounted on the reproduction apparatus 20 as shown in Fig. 18(b). The information window 80 displays various kinds of information such as the title of the disc, a genre, artists, name of songwriters, and name of music arrangers. In addition, the information window 80 also includes an address display 81 showing a URL for obtaining more detailed information.

[0079]

On the address display 81, a string of characters is displayed with a format of "http://www.***..." which is recognized as a URL in address-detection processing. The display format of the address-display 81 is typically italic, underlined characters, or characters having a color different from colors of other items appearing on the information window 80. By providing such a different display format to the address display 81, the user is notified that address information is also displayed on the window 80. Then, when the address display 81 is selected by the pointer 79 and clicked, a communication

process indicated by the string of characters with a format of "http://www.***..." is established.

[0080]

In this case, since the string of characters represents a URL, the user is capable of recognizing from the beginning a server apparatus in the network, to which the communication process is established.

As described above, the information window 80 shown in Fig. 18(b) displays a URL included in the information on the disc as an example of disc information. In the case of an omnibus album such as the ones shown in Figs. 17, however, the information window 80 is also capable of displaying track information along with a URL for each piece of track.

[0081]

Also as described above, a URL is displayed on the address display 81 shown in Fig. 18(b). It should be noted, however, in the case that an electronic-mail address is displayed, software for forming the electronic-mail address is activated.

In addition, the display formats of the icons and the string of characters shown in Figs. 16, 17, and 18 which, indicate address information are typical. Thus, other display formats suitable for the configuration of

the operation window can also be used.

[0082]

(6) Disc Mounting Processing

The following is a description of processing operation carried out by the control unit 11 to establish a communication processing based on a character string representing address information (a URL or an electronic-mail address) extracted from CD-TEXT data.

It should be noted that the following description assumes that the user has performed initialization setting to register necessary browser software and the mail software in advance into typically a recording medium 5 of the computer apparatus 1.

[0083]

When the disc 21 is mounted on the reproduction apparatus 20 (S001), the CD-TEXT data recorded in the lead-in area of the disc 21 is read out and decoded before being stored into the memory 6 (S002). Then, the character information is searched for a string of characters. The range of the search for a string of character representing address information can be the entire character data of the CD-TEXT data, or limited to

a portion assumed to include at least a string of character representing an address by identifying an ID. For example, in the case of ID1 shown in Fig. 14, portions other than those indicated by ID1 values of "88h", "89h", and "8Fh" are taken as a range of the search.

Then, when a string of characters representing address information has been found in the search (S003), the string of characters found in the search is recognized as address information (S004) and the display is performed in a required format for this string of character (a URL or a mail address) (S005). It should be noted that information such as the disc title and names of artists is displayed as ordinary character information.

Thus, when a driver software for the reproduction apparatus 20 is activated, it is possible to display address icons 76 and 78 on the operation windows 70 shown in Figs. 16, Figs. 17 or display the address display 81 on the information window 80 shown in Figs. 18.

[0084]

When a click operation has been carried out on the address icon 76 or the address display 81 as described while displaying the operation window 70 or the information window 80 (S006), the judgment whether the

address icon 76 or the address display 81 represents a URL or a mail address is performed (S007).

If the address icon 76 or the address display 81 represents a URL, the browser software is activated (S008), and communication processing to make an access to the URL is carried out (S009).

If the address icon 76 or the address display 81 represents a mail address, on the other hand, the processing to activate the mailer is carried out with the mail address set as a transmission destination.

[0085]

As described above, character information is searched, and the string of characters for the address information is recognized as address information. Then, it is possible to carry out processing that allows an access based on the address information to the network.

Thus, it is no longer necessary for the user to carry out an operation to enter a string of characters representing an address to the browser software and the like. In addition, since address information detected from the CD-TEXT data is displayed as an icon or a string of characters with a predetermined format, the user is easy-to-use for capability of recognizing the address information with ease.

Moreover, since almost all recorded characters are the search object, and whole string of characters are searched; it is not necessary for the creator of the CD-TEXT to record an address in a special format.

[0086]

As described above, the embodiment implements a reproduction apparatus for reproducing information from a CD-DA as a disc. It should be noted, however, that the present invention can also be applied to a reproduction apparatus for reproducing a disc such as a DVD.

[0087]

As described above, the present invention is capable of recognizing a string of characters in predetermined array as required address information from a string of character read out from the predetermined area in a recording medium. Further, the address information is displayed in a display format, which is for an access processing, on an operation screen for operating predetermined operation to the recording medium.

As a result, by selecting the address information on the operation screen, the access processing is carried out. Therefore, the user can perform the access processing by eliminating a troublesome operation, which the address information is inputted by manually.

[Brief Description of the Drawings]

[Fig. 1]

Fig. 1 is an explanatory block diagram showing the configuration of a computer apparatus implemented by an embodiment of the present invention;

[Fig. 2]

Fig. 2 is an explanatory block diagram showing the configuration of a reproduction apparatus (a CD player) implemented by an embodiment of the present invention;

[Fig. 3]

Fig. 3 is an explanatory diagram showing the frame structure of a disc (a CD);

[Fig. 4]

Figs. 4 are explanatory diagrams used for explaining sub-coding of a disc (a CD);

[Fig. 5]

Figs. 5 are explanatory diagrams used for explaining sub-Q data of a disc (a CD);

[Fig. 6]

Fig. 6 is an explanatory diagram used for explaining TOC data of a disc (a CD);

[Fig. 7]

Figs. 7 are explanatory diagrams comprehensively showing the structure of text data;

[Fig. 8]

Figs. 8 are explanatory diagrams showing a structural relation between a sub-coding frame and text data;

[Fig. 9]

Fig. 9 is an explanatory diagram showing the structure of a packet as text data;

[Fig. 10]

Figs. 10 are explanatory diagrams used for explaining a process of forming a pack from data of symbol units as a structure of text data;

[Fig. 11]

Fig. 11 is an explanatory diagram showing the structure of a pack;

[Fig. 12]

Fig. 12 is an explanatory diagram showing the structure of ID1;

[Fig. 13]

Figs. 13 are explanatory diagrams showing the structures of ID1 to ID4;

[Fig. 14]

Fig. 14 is an explanatory diagram showing the defined contents of ID1;

[Fig. 15]

Fig. 15 is an explanatory diagram showing the structure of a pack for storing the name of a piece of music of a track as text data;

[Fig. 16]

Figs. 16 are explanatory diagrams showing a display format of a driver employed in the reproduction apparatus;

[Fig. 17]

Figs. 17 are explanatory diagrams showing another display format of a driver employed in the reproduction apparatus;

[Fig. 18]

Figs. 18 are explanatory diagrams showing still another display format of a driver employed in the reproduction apparatus; and

[Fig. 19]

Fig. 19 shows a flowchart representing processing to recognize address information.

[Description of Reference Numerals]

1 computer apparatus, 4 control unit, 5 recording medium, 6 memory, 21 disc, 40 sub-code processor, 41 system controller, 42 interface, 76 address-icon, 76a mail icon, 76b URL icon, 78 access icon, 81 address display.

[Name of Document] Abstract of the Disclosure

[Abstract]

[Object] A string of character search is performed for a string of character of character information, and the string of character for address information is recognized as the address information.

[Solving Means] When a disc 21 is mounted on a reproduction apparatus 20 (S001), CD-TEXT data recorded in the lead-in area is read out and decoded before being stored into a memory (S002). Then, a string of character search is performed for the character information. When a string of characters representing address information has been found in the search (S003), the string of characters is recognized as address information and displayed in a display format for a string of characters (a URL or a mail address).

[Selected Drawing] Fig. 19

In the drawings:

[Fig. 1]

(A) Network line

(B) Picture signal

(C) Audio signal

11 Modem/ta

7 Picture-signal processing

8 Monitor apparatus

6 Memory

20 Reproduction apparatus

4 Control unit

9 Audio-signal processing

5 Recording medium

10 Speaker

2 Keyboard

3 Mouse

1 Computer apparatus

[Fig. 2]

33 Driver

32 Servo-signal processing

34 Driver

31 RF amplifier

36 EFM-demodulation

38 Signal processing

39 CLV processor

37 Timing-generation

40 Sub-code processor

41 System controller

1 Computer apparatus

51 Descrambler

20 Reproduction apparatus

[Fig. 3]

(A) one frame (588 bits)

(B) Main data, (C) Parity, (D) Main data, (E) Parity

(F) Synchronization data, (G) Sub-code,

(H) Margin bits

[Fig. 4(a)]

(A) Frame, (B) Sub-coding frame

(C) Synchronization pattern (S0)

(D) Synchronization pattern (S1)

[Fig. 4(b)]

(A) Control, (B) Address, (C) Sub-Q data

[Fig. 5(a)]

(A) Sub-Q data in lead-in area (TOC)

(B) Track number TNO

(C) 72 bits

[Fig. 5(b)]

(A) Sub-Q data in track number #1 to #n and lead-out area

(B) Track number TNO (01-99), (C) Index X (01-99)

(D) 72 bits

[Fig. 6]

(A) TOC structure (example of disc of six tracks)

(B) Block No.

(C) Start point of track #1

(D) Start point of track #2

(E) Start point of track #3

(F) Start point of track #6

(G) Track number of the first track on the disc

(H) Track number of the last track on the disc

(I) Start point of a lead-out track

(J) Repeated

[Fig. 7(a)]

(A) Up to 2048 packs

(B) (Up to 512 packs are recommended)

(C) Text, (D) Text, (E) Text, (F) Text

[Fig. 7(b)]

(A) Block 0, (B) Block 1, (C) Block n,

(D) (Up to 8 blocks)

[Fig. 7(c)]

(A) Pack (0), (B) Pack (1), (C) Pack (2),

(D) Pack (n), (E) (Up to 256 packs)

(F) Comprehensive structure of text data

[Fig. 8(a)]

(A) Sub-coding grame

(B) Sub-coding frame

(C) 98 frames

(D) Synchronization pattern S0

(E) Synchronization pattern S1

(F) Frame

(G) Sub-code P

(H) Sub-code Q

(I) Pack 0

(J) Pack 1

(K) Pack 2

(L) Pack 3

[Fig. 8(b)]

Symbol

[Fig. 8(c)]

Symbol

[Fig. 9]

(A) Synchronization pattern

(B) Synchronization pattern

(C) Pack 0

(D) 18 bytes

(E) Pack 1

(F) 18 bytes

(G) Pack 2

(H) 18 bytes

(I) Pack 3

(J) 18 bytes

(K) Text-data area

(L) CRC area

(N) 16 bytes

(M) 2 bytes

(O) 1 packet (= 96 symbols)

[Fig. 10(a)]

Symbol

[Fig. 10(b)]

(A) 1 pack (18 bytes)

(B) Text-data area, (C) CRC area

(D) 16 bytes, (E) 2 bytes

(F) (16 bits)

[Fig. 11]

(A) ID area, (B) Text-data area

(C) Pack

(D) 8 bits...

(E) Text-data area

(F) CRC area

(G) 8 bits..., (H) 16 bits

[Fig. 13(b)]

(A) Extension flag, (B) Track number (or pack element number)

[Fig. 13(c)]

(A) Sequence number in a block (00 to 255, 00h to FFh)

[Fig. 13(d)]

(A) 2-byte-code flag, (B) Block number

(C) (1 = 2 bytes

0 = 1 byte)

(D) Character position of a present pack

0000 = 1st character

0001 = 2nd character

0010 = 3rd character

0011 = 4th character

0100 = 5th character

0101 = 6th character

1110 = 15th character

1111 = 16th or subsequent character

[Fig. 14]

1D1 Identification contents

80h Name of album (ID2 = 00h)/name of the piece on track

(ID2 = 01h to 63h)

81h Name of Performer/conductor/orchestra

82h Name of lyric writer

83h Name of song writer

84h Name of music arranger

85h Message

86h Disc ID

87h Genre

8Ah Reserved

8Bh Reserved

8Ch Reserved

8Dh Control

8Fh Size

[Fig. 15]

(A) ID area, (B) Text-data area

(C) Pack

(D) Character string (E) Name of album/Name of the piece

(F) Text-data area

(G) CRC area

(H) Structure of a pack to store a data of a piece of music for track

[Fig. 16]

70 Operation window

71 Menu bar

73 Disc-title display portion

74 Artist-name display portion

75 Track-name display portion

77 Operation-icon group

[Fig. 17]

78 Access icon

[Fig. 18]

79 Pointer

80 Information Window

81 Address display

[Fig. 19]

S001 Mount a disc

S002 Read out CD-TEXT data

S003 Was a character string corresponding to address information detected?

S004 Recognize the detected character string as address information

S005 Display the address information in a required display format

S006 Was there a click for the address information?

S007 Is the address information a URL or a mail address?

S008 Activate the browser

S009 Carry out communication processing to access the URL

S010 Activate the mailer with the mail address used as a

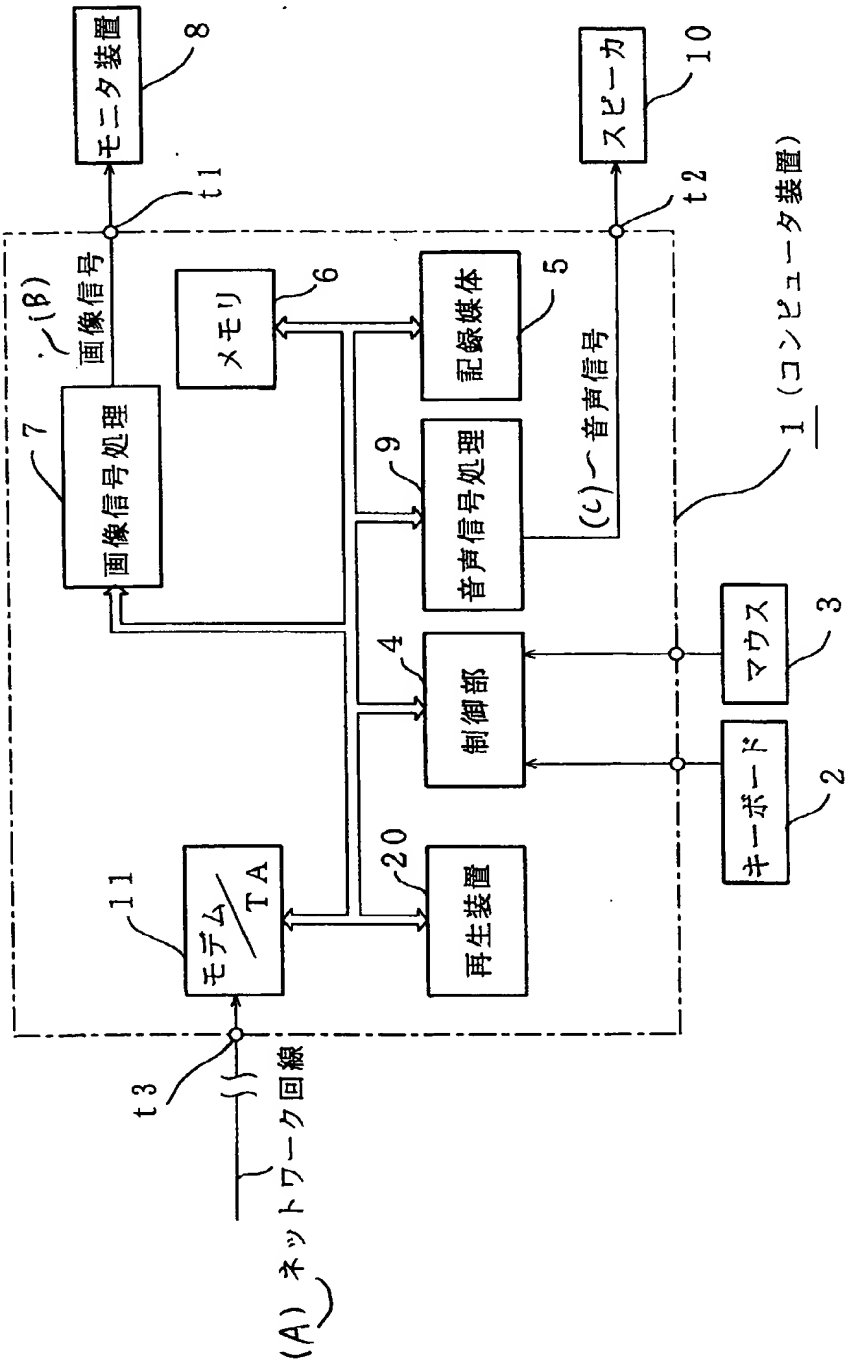
transmission destination

(A) Mail address

包袋：A，出願番号：10-094582，担当：890017

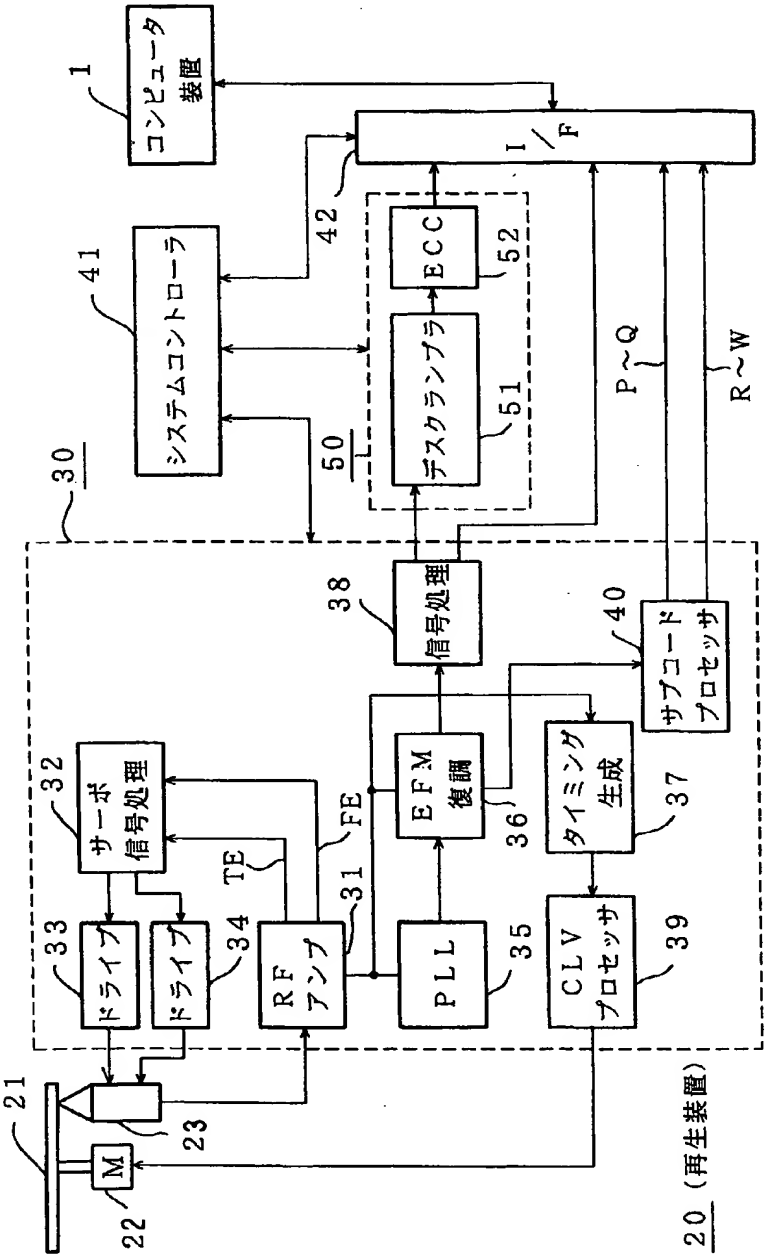
【書類名】図面

【図１】

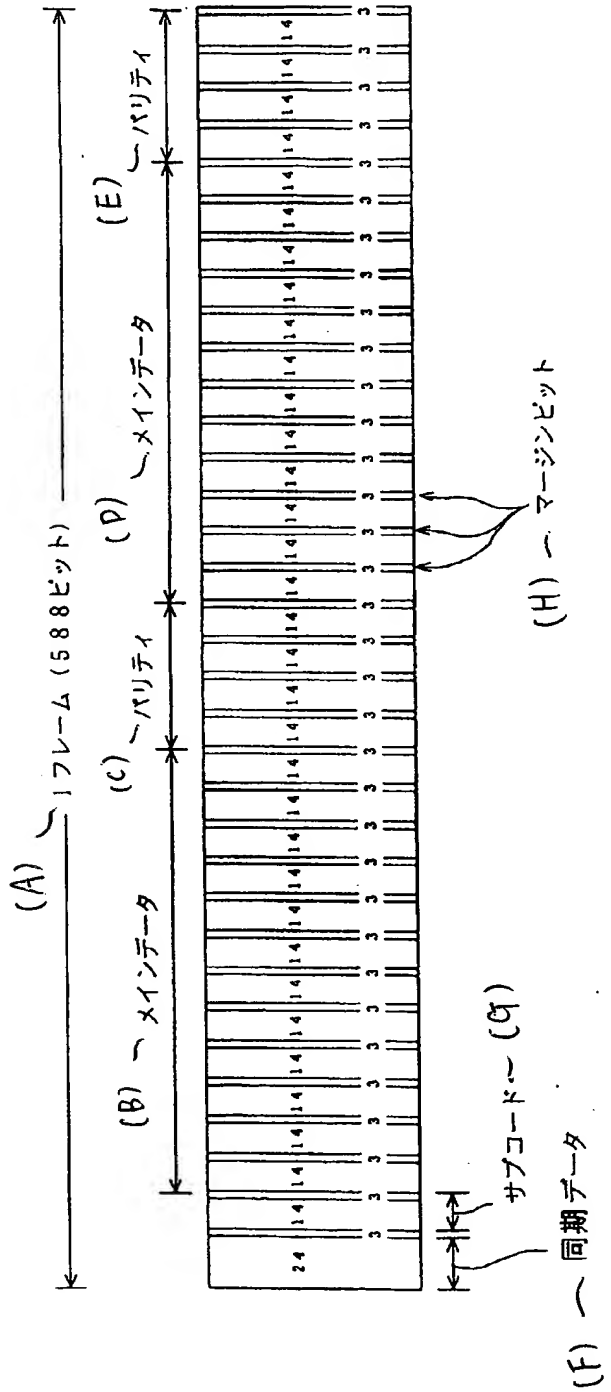


包袋：A，出願番号：10-094582，担当：890017

【図２】



【図３】


(A) 1フレーム(588ビット)
(B) メインデータ
(C) パリティ
(D) メインデータ
(E) パリティ
(F) 同期データ
(G) サブコード
(H) マージンビット

包袋：A，出願番号：10-094582，担当：890017

【図４】

(A) フレーム　　(B)サブコーディングフレーム

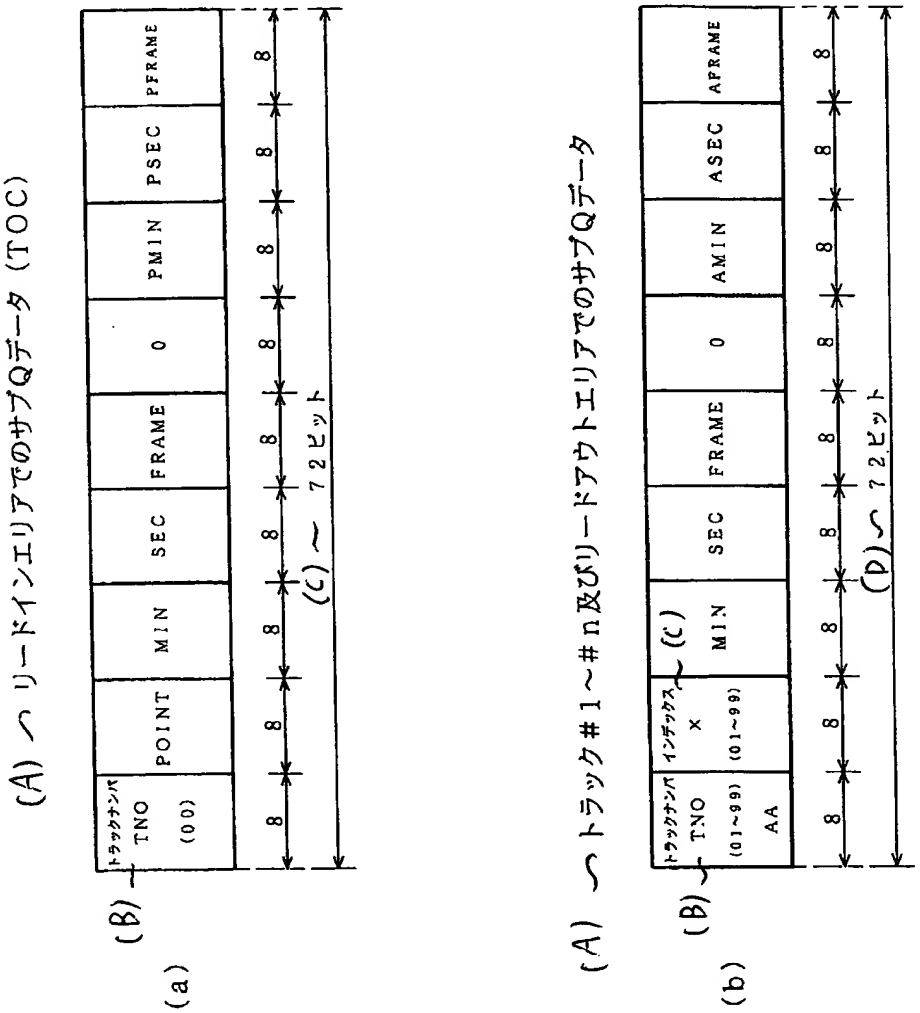
(a)

(A) フレーム	(B)サブコーディングフレーム
98n+1	(C) ～ 同期パターン（S0）
98n+2	(D) ～ 同期パターン（S1）
98n+3	P_1 Q_1 R_1 S_1 T_1 U_1 V_1 W_1
98n+4	P_2 Q_2 R_2 S_2 T_2 U_2 V_2 W_2
⋮	⋮
98n+97	P_{95} Q_{95} R_{95} S_{95} T_{95} U_{95} V_{95} W_{95}
98n+98	P_{96} Q_{96} R_{96} S_{96} T_{96} U_{96} V_{96} W_{96}
$98_{(n+1)}+1$	

(b)

Q_1～Q_4	Q_5～Q_8	Q_9 ～ Q_{80}	Q_{81} ～ Q_{96}
コントロール	アドレス	サブQデータ	CRC
(A)	(B)	(C)	

【図５】


(A) ～リードインエリアでのサブQデータ（TOC）
トラックナンバ TNO (00)
POINT
MIN
SEC
FRAME
0
PMIN
PSEC
PFRAME
8
(B)
(C) ～ 72ビット
(a)
(A) ～トラックナンバ#1～#n及びリードアウトエリアでのサブQデータ
トラックナンバ TNO (01~99) AA
インデックス × (01~99)
(C)
MIN
SEC
FRAME
0
AMIN
ASEC
AFRAME
(B)
(D) ～ 72ビット
(b)

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【図６】

(A) ～ TOC構成（6トラック入ディスクの例）

TNO	ブロックNo.(B)	POINT	PMIN、PSEC、PFRAME	
00	n	01	00. 02. 32	トラック#1のスタートポイント～(C)
	n+1	01	00. 02. 32	
	n+2	01	00. 02. 32	
	n+3	02	10. 15. 12	トラック#2のスタートポイント～(D)
	n+4	02	10. 15. 12	
	n+5	02	10. 15. 12	
	n+6	03	16. 28. 63	トラック#3のスタートポイント～(E)
	n+7	03	16. 28. 63	
	n+8	03	16. 28. 63	
	n+9	04	• •	
	n+10	04	• •	
	n+11	04	• •	
	n+12	05	• •	
	n+13	05	• •	
	n+14	05	• •	
	n+15	06	49. 10. 03	トラック#6のスタートポイント～(F)
	n+16	06	49. 10. 03	
	n+17	06	49. 10. 03	
	n+18	A0	01. 00. 00	ディスクの最初のトラックのトラックナンバ～(G)
	n+19	A0	01. 00. 00	
	n+20	A0	01. 00. 00	
	n+21	A1	06. 00. 00	ディスクの最後のトラックのトラックナンバ～(H)
	n+22	A1	06. 00. 00	
	n+23	A1	06. 00. 00	
	n+24	A2	52. 48. 41	リードアウトトラックのスタートポイント～(I)
	n+25	A2	52. 48. 41	
00	n+26	A2	52. 48. 41	
00	n+27	01	00. 02. 32	くり返す～(J)
	n+28	01	00. 02. 32	
	•	•	• •	
	•	•	• •	
	•	•	• •	

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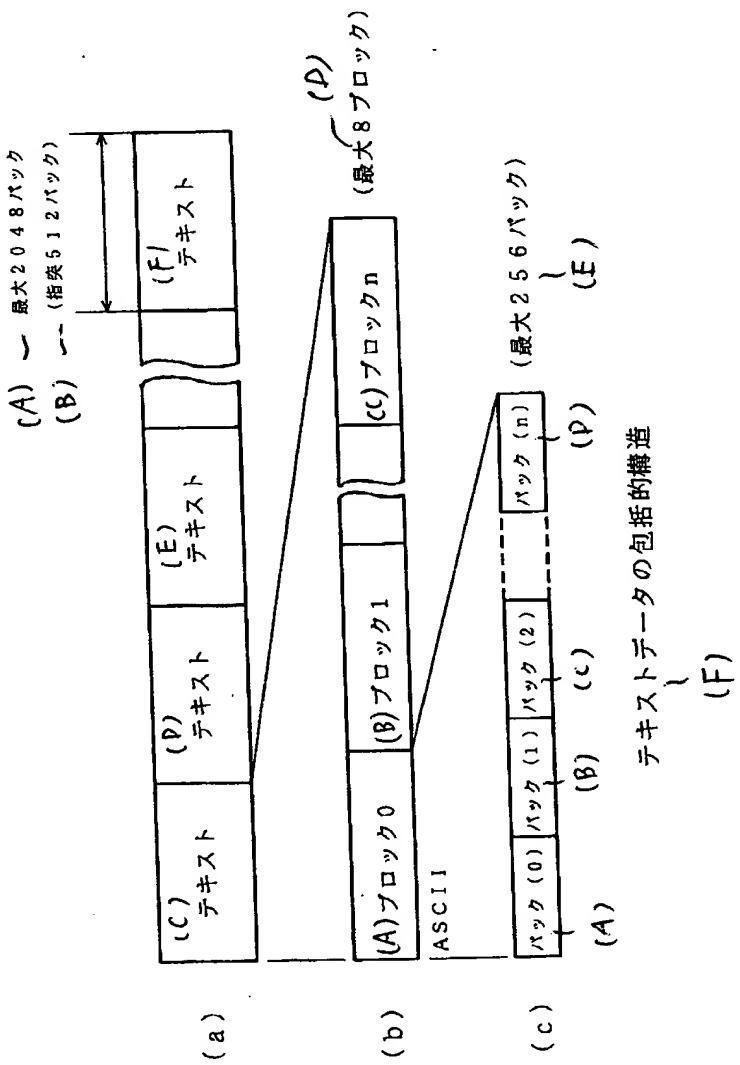
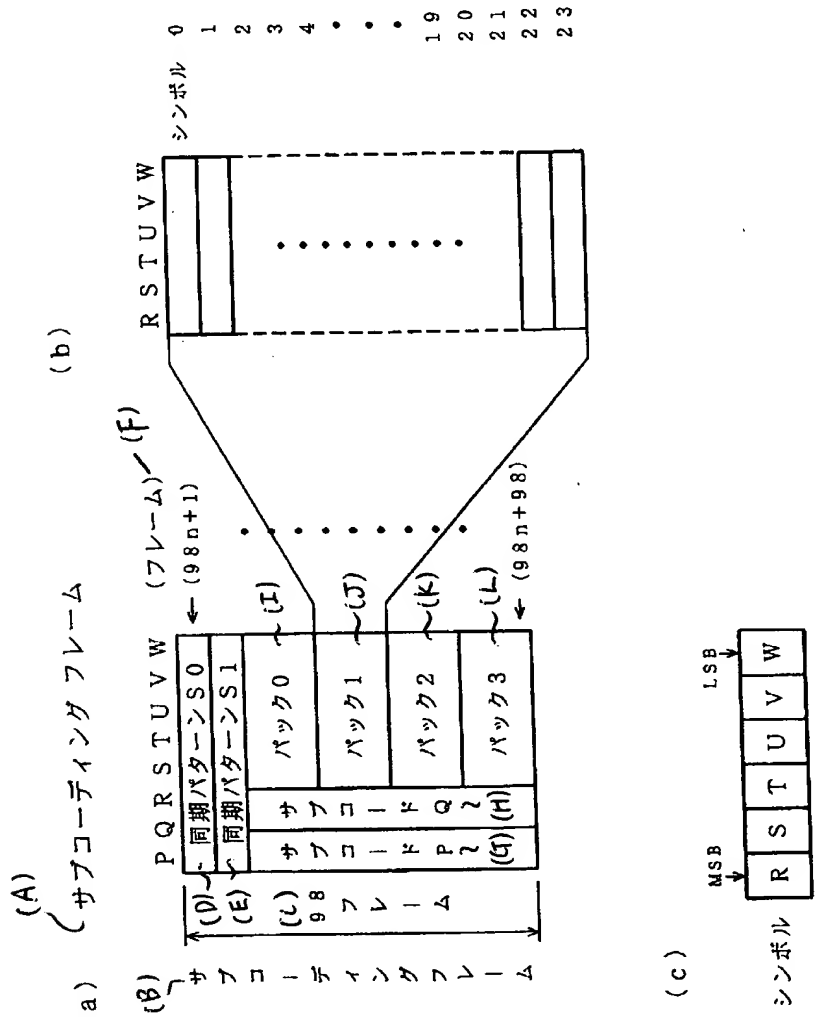
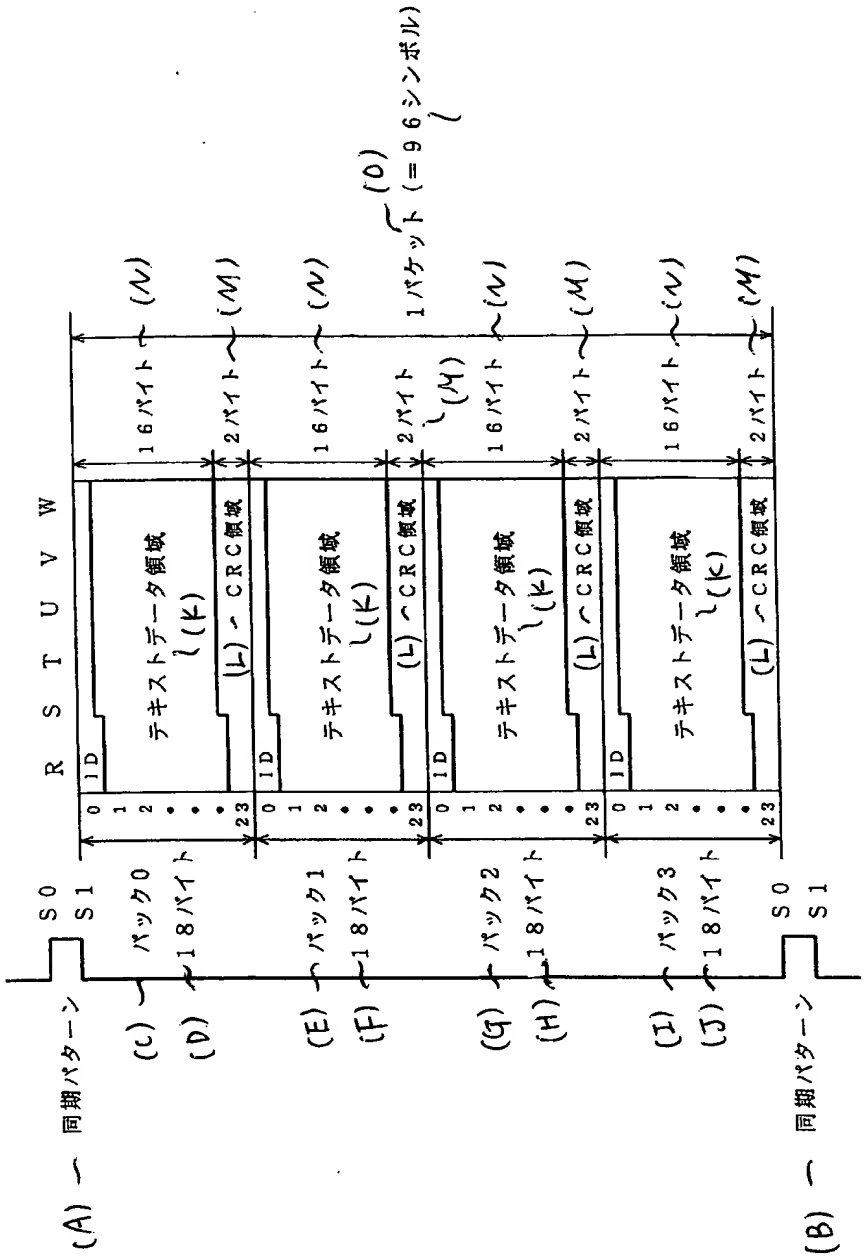
【図７】



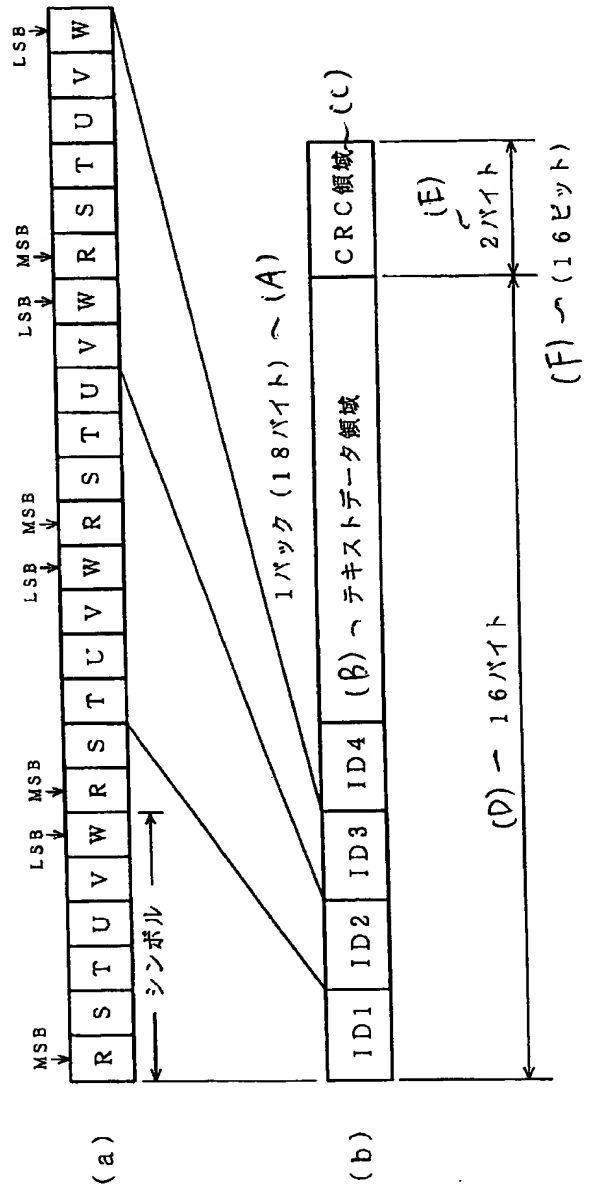
【図８】


(A)
サブコーディングフレーム
(a)
(B)
サブコーディングフレーム
(C)
98フレーム
(D)
同期パターンS0
(E)
同期パターンS1
P Q R S T U V W
(F)
(フレーム)
(98n+1)
(98n+98)
(I)
(J)
(K)
(L)
パック0
パック1
パック2
パック3
サブコードPQ
(G)
(H)
(b)
R S T U V W
シンボル
0 1 2 3 4 19 20 21 22 23
(c)
MSB
LSB
R S T U V W
シンボル

【図９】


(A) 同期パターン
S0
S1
(C) パック0
18バイト
(D)
(E) パック1
18バイト
(F)
(G) パック2
18バイト
(H)
(I) パック3
18バイト
(J)
S0
S1
(B) 同期パターン
R S T U V W
0 1 2 • • 23
1D
テキストデータ領域 (K)
(L) CRC領域
16バイト
2バイト
(M)
(N)
(O) 1パケット (=96シンボル)

【図１０】


LSB
MSB
R
S
T
U
V
W
シンボル
1パック（18バイト）～(A)
ID1
ID2
ID3
ID4
(B)～テキストデータ領域
CRC領域
(C)
(E)
2バイト
(D)～16バイト
(F)～(16ビット)
(a)
(b)

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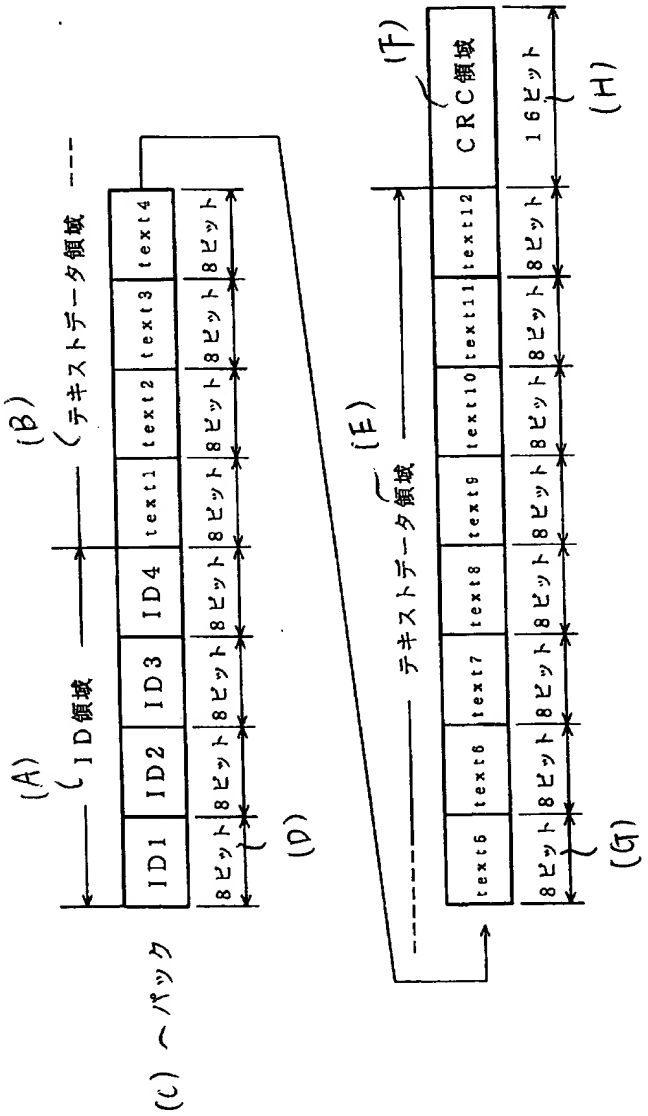
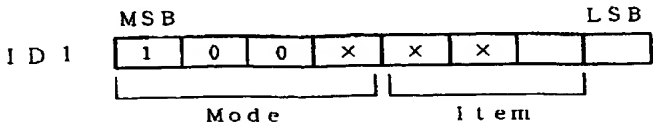
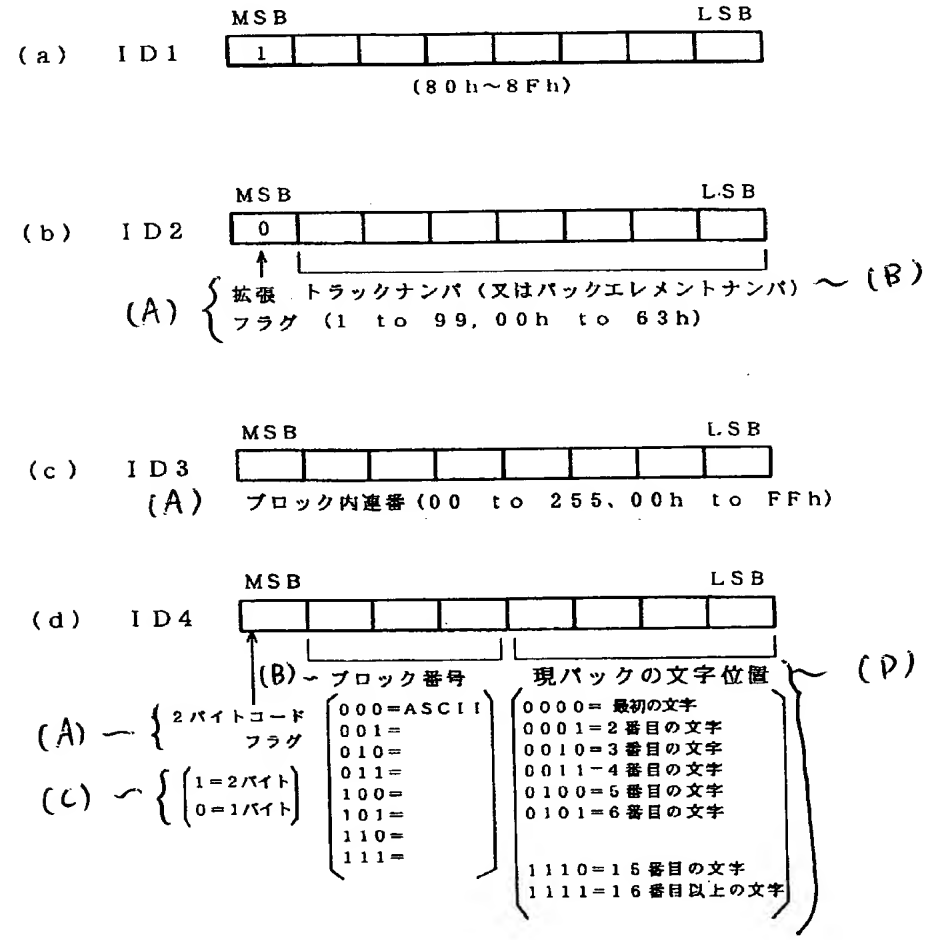
【図１１】



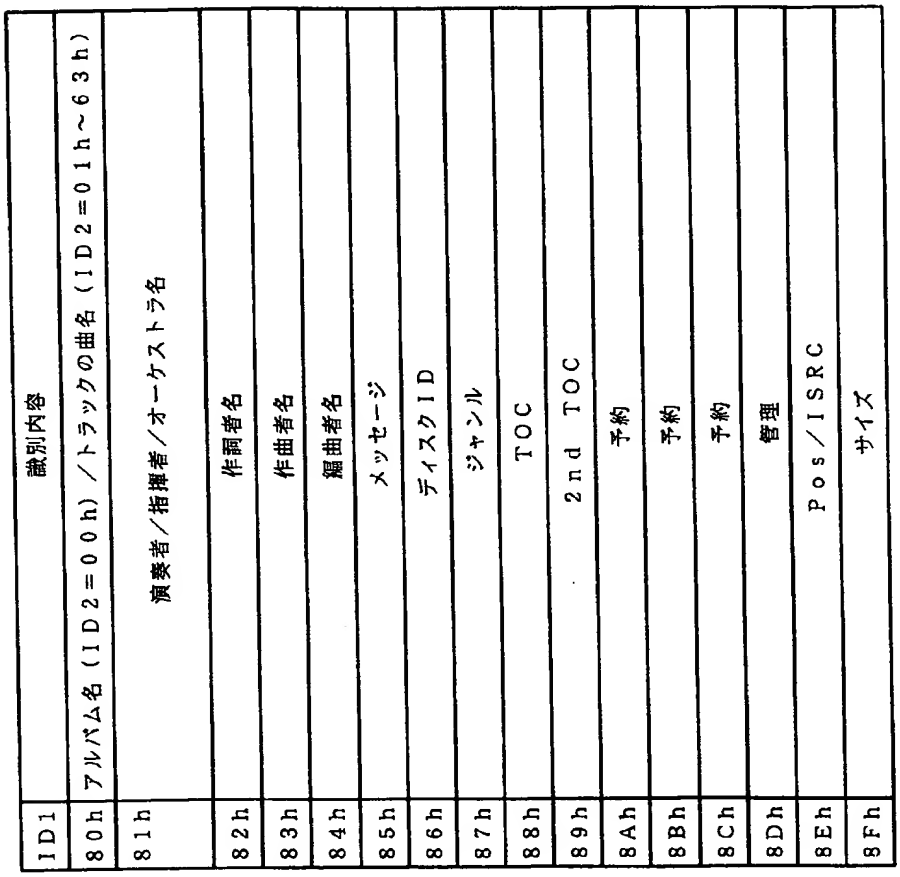
【図１２】


MSB
LSB
ID1
1
0
0
×
×
×
Mode
Item

【図１３】


(a) ID1
MSB
LSB
1
(80h～8Fh)
(b) ID2
MSB
LSB
0
(A) 拡張フラグ
トラックナンバ（又はバックエレメントナンバ）～(B)
(1 to 99, 00h to 63h)
(c) ID3
MSB
LSB
(A) ブロック内連番（00 to 255、00h to FFh）
(d) ID4
MSB
LSB
(B)～ブロック番号
現パックの文字位置～(D)
(A)～2バイトコードフラグ
(C)～1=2バイト 0=1バイト
000=ASCII
001=
010=
011=
100=
101=
110=
111=
0000= 最初の文字
0001=2番目の文字
0010=3番目の文字
0011=4番目の文字
0100=5番目の文字
0101=6番目の文字
1110=15番目の文字
1111=16番目以上の文字

【図１４】



IDI	識別内容
80h	アルバム名（ID2＝00h）／トラックの曲名（ID2＝01h～63h）
81h	演奏者／指揮者／オーケストラ名
82h	作詞者名
83h	作曲者名
84h	編曲者名
85h	メッセージ
86h	ディスクID
87h	ジャンル
88h	TOC
89h	2nd TOC
8Ah	予約
8Bh	予約
8Ch	予約
8Dh	管理
8Eh	Pos／ISRC
8Fh	サイズ

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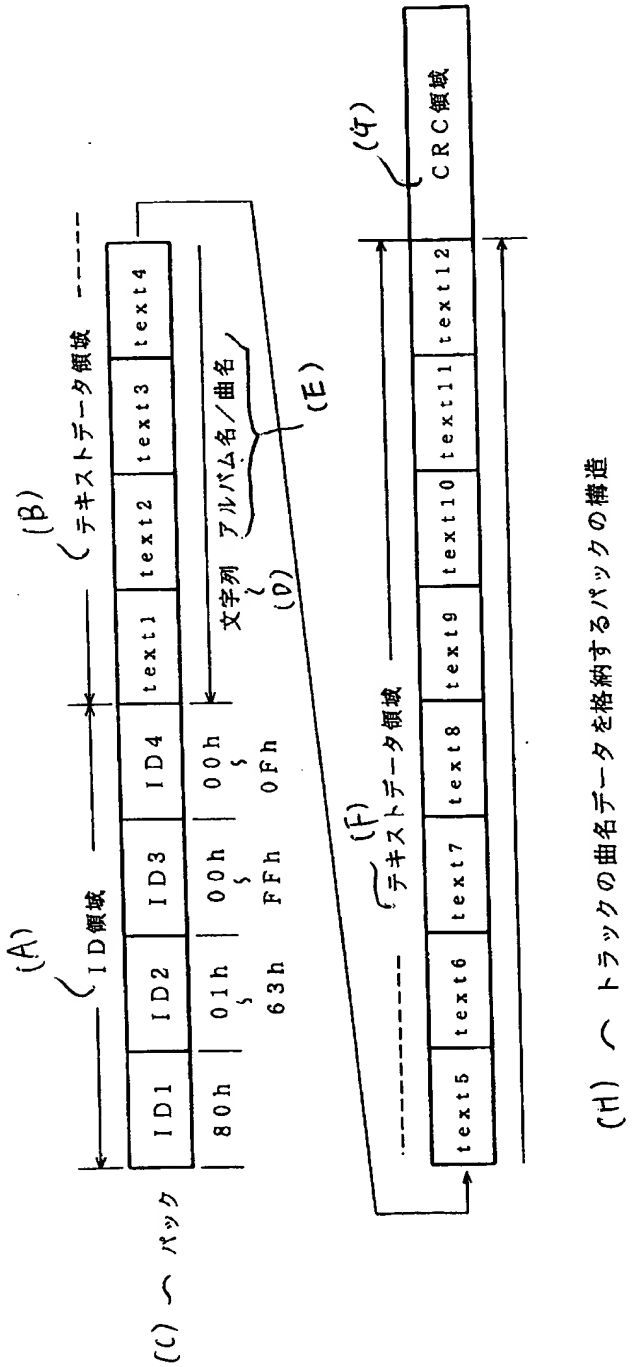
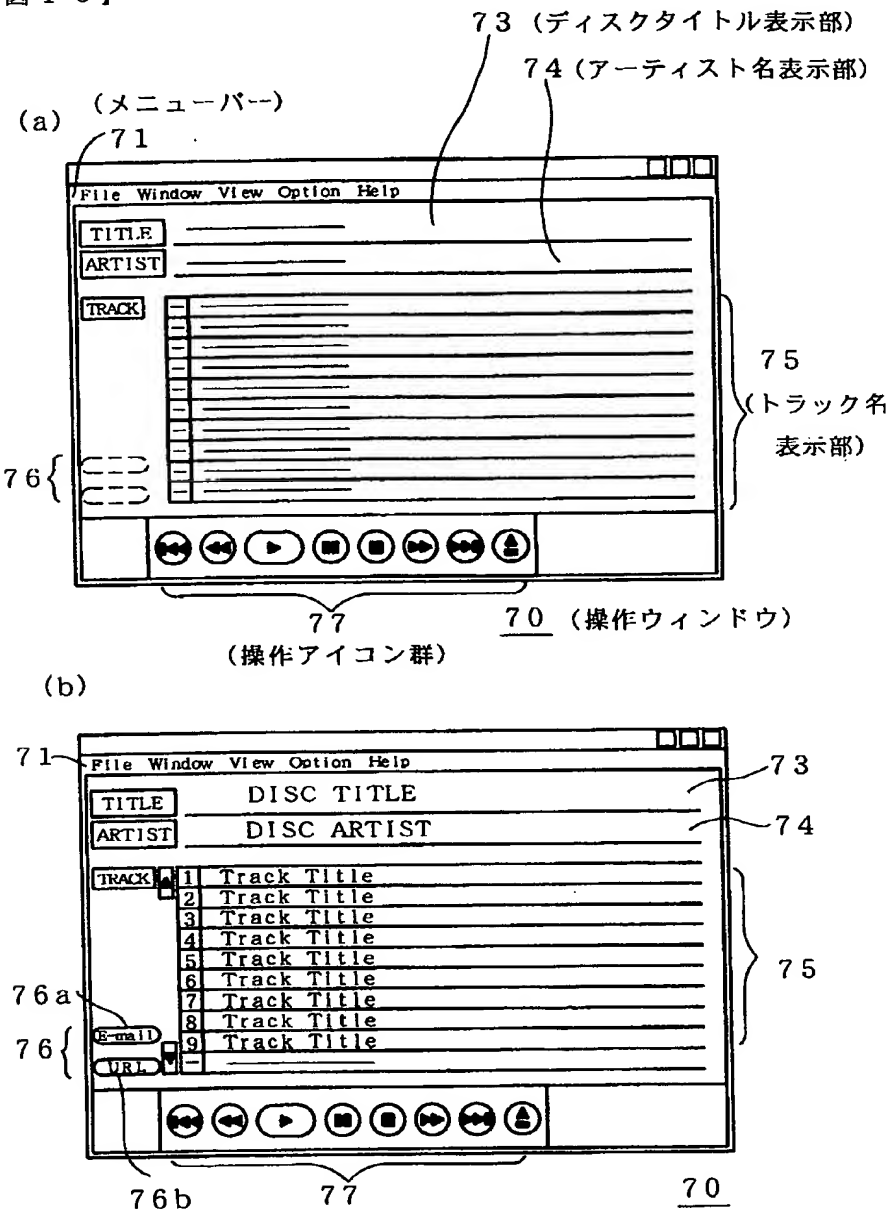
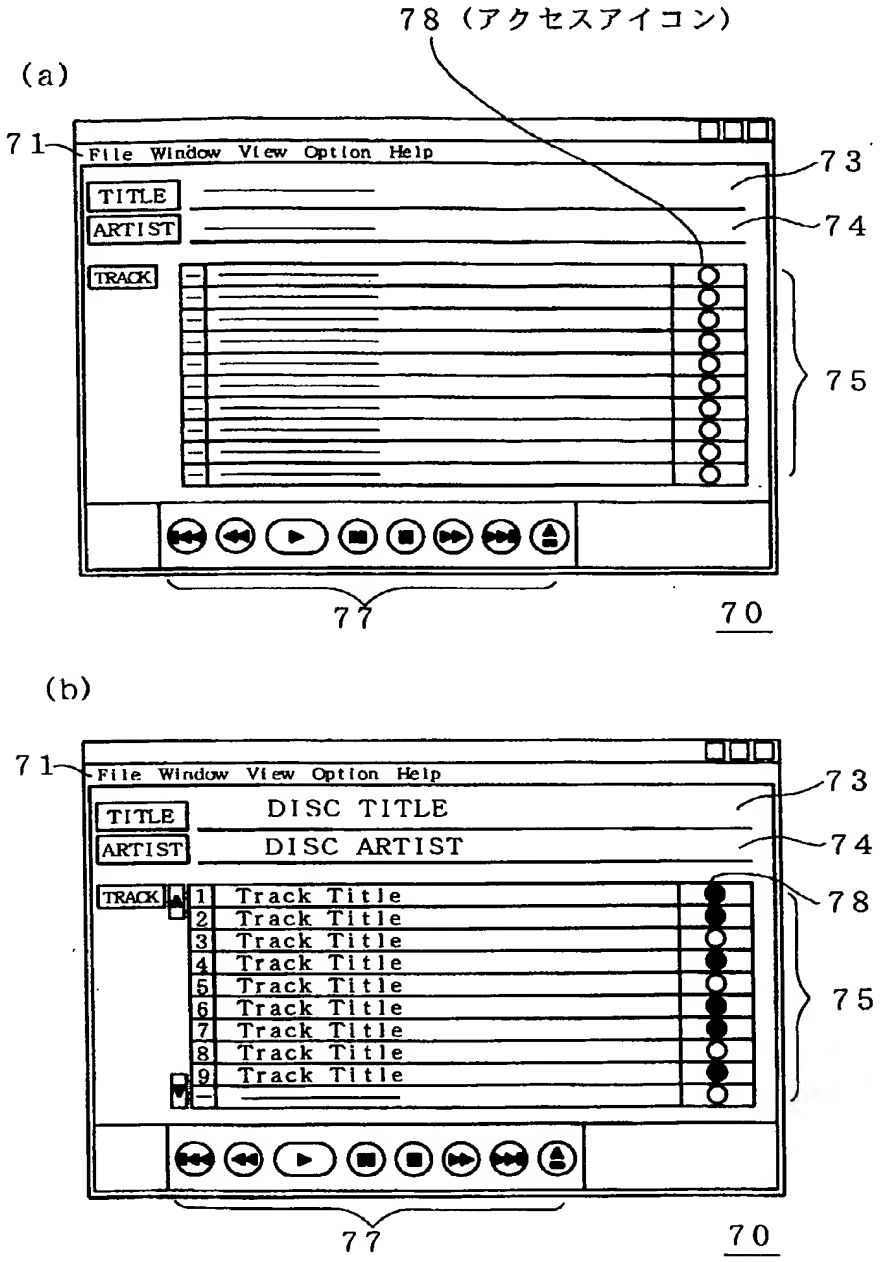
【図１５】



【図１６】


73（ディスクタイトル表示部）
74（アーティスト名表示部）
(a)
（メニューバー）
71
File Window View Option Help
TITLE
ARTIST
TRACK
75
（トラック名
表示部）
76
77
（操作アイコン群）
70（操作ウィンドウ）
(b)
71
File Window View Option Help
73
TITLE
DISC TITLE
ARTIST
DISC ARTIST
74
TRACK
1 Track Title
2 Track Title
3 Track Title
4 Track Title
5 Track Title
6 Track Title
7 Track Title
8 Track Title
9 Track Title
75
76a
E-mail
76
URL
76b
77
70

【図１７】


78（アクセスアイコン）
(a)
71
File Window View Option Help
TITLE
ARTIST
TRACK
73
74
75
77
70
(b)
71
File Window View Option Help
TITLE
DISC TITLE
ARTIST
DISC ARTIST
TRACK
1 Track Title
2 Track Title
3 Track Title
4 Track Title
5 Track Title
6 Track Title
7 Track Title
8 Track Title
9 Track Title
73
74
78
75
77
70

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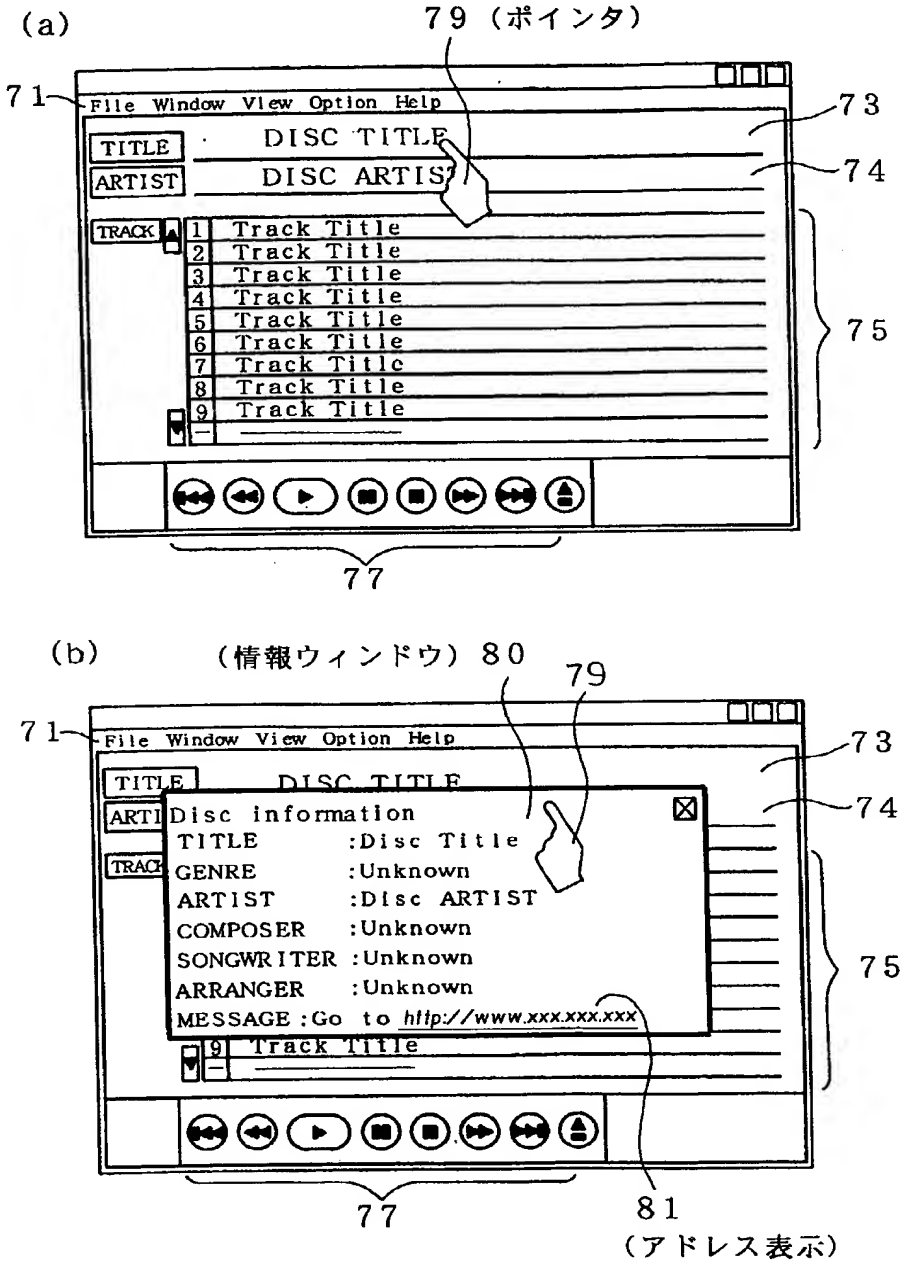
【図１８】



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【図１９】